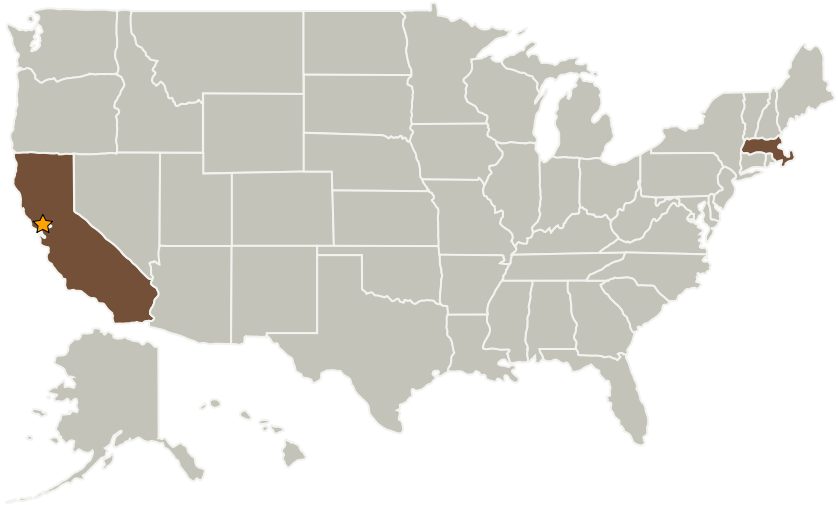
# Cable-Free Sensor-Bus for Large Area Composites, Phase I

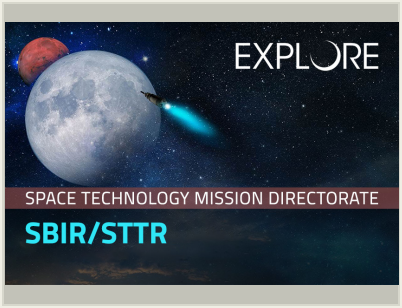
Completed Technology Project (2009 - 2009)

## Project Introduction

Traditional structural health monitoring (SHM) methods have been limited due to the implied infrastructure, including wires for power and communication from each sensor to data acquisition units. Presently, Metis Design Corporation (MDC) has demonstrated the patented technique of point-of-measurement datalogging. During the proposed research, MDC will further exploit this SHM architecture to satisfy NASA mission specifications. This work focuses on a Boeing Proprietary technology that allows cable-free transfer of electrical signals. To date, this technology has been demonstrated to successfully power and transfer data from analog sensor arrays. During Phase I, MDC will work with Boeing to demonstrate this technology for a digital sensor bus. The first task will aim to modify the existing sensor hardware to be physically compatible with such a bus. The second task will investigate attachment mechanisms that will provide the necessary electrical connections while not sacrificing strength or structural coupling for wave propagation. The third task will seek to design an impedance matching circuit for the sensor-bus to support multiple sensors for both power and data on the same CAN-style bus. The final task will piece each of these components together to demonstrate damage detection and localization on a composite plate supplied by Boeing.

## Primary U.S. Work Locations and Key Partners



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## Table of Contents



## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Center / Facility:**

Ames Research Center (ARC)

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

**Small Business Innovation Research/Small Business Tech Transfer**

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| Organizations Performing Work | Role | Type | Location |
|---|---|---|---|
| ★Ames Research Center(ARC) | Lead Organization | NASA Center | Moffett Field, California |
| Metis Design Corporation | Supporting Organization | Industry | Boston, Massachusetts |

| Primary U.S. Work Locations | |
|---|---|
| California | Massachusetts |

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

## Technology Areas

**Primary:**

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.2 Structures
    - TX12.2.3 Reliability and Sustainment